

AMENDMENTS TO THE SPECIFICATION

Page 1, line 1 to Page 2, line 4

ETCHING APPARATUS AND PROCESS WITH THICKNESS AND UNIFORMITY CONTROL

Background of the Invention

Field of Invention

This invention pertains generally to the processing of silicon wafers, other substrates, or other flat workpieces used in semiconductor, Micro-Electro-Mechanical Systems (MEMS), magnetoelectronic or flat panel display manufacturing and, more particularly, to the etching of, or deposition on such wafers, substrates or other workpieces. It provides an apparatus and method for rapidly changing in an automatic, controlled manner the spatial distribution of etching the workpiece or a film thereupon, or changing properties such as thickness or material properties of a film deposited across that substrate or workpiece.

One particular use of this invention may be as a part of the sequence of manufacturing steps for producing monocrystalline silicon wafers for semiconductor integrated circuits. As such integrated circuits decrease in size and improve in performance higher quality silicon wafers will be required. Furthermore, soon the wafer size for some new factories will be increasing to 300 mm which makes further demands on wafer quality for the sake of photolithographic process performance. Such wafers will have to be very uniform in thickness and be free of damage such as microscopic scratches and crystal dislocations caused by the mechanical grinding processes that are in common use. Yet, such wafers need to be low in cost so as to reduce integrated circuit cost.

Related Art

In the current production method for wafers slices are cut from an ingot of silicon which are ground or lapped to a thickness slightly greater than desired and an acceptable level of thickness non-uniformity. These slices then have their damaged silicon removed, by lapping, polishing or by a wet etching process, and are further polished to acceptable smoothness which reduces the wafer to its final desired thickness.

Page 6, lines 9 - 11

Objects and Summary

It is in general an object of the invention to provide a new and improved system and method for plasma-based etching a silicon or other substrate, or film thereupon, or for depositing a film on a substrate.

Page 12, lines 8 - 9

Brief Description of the Drawings

Figure 1 is a sectional view, somewhat schematic, of a standard parallel plate reactor of the prior art.

Page 12, lines 19 - 22

Detailed Description

Etching of or thin film deposition on a substrate with a desired non-uniform rate or film properties are achieved in this invention by providing independent control of gas mixtures and/or gas flow rates to different parts of the processing plasma volume above the substrate.